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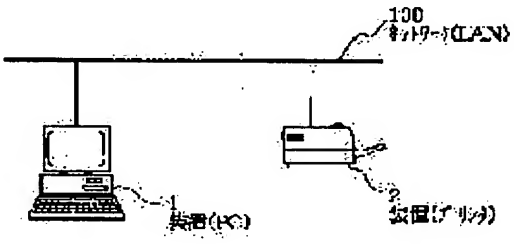
(54) NETWORK SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide the network system of a multi-protocol environment capable of automatically selecting an appropriate protocol and performing communication between devices connected through a network without troubling a user for protocol setting.

SOLUTION: In this network system of the multi-protocol environment composed by interconnecting the plural devices 1 and 2 respectively capable of selectively using the plural kinds of the protocols through a LAN 100, the respective devices 1 and 2 hold parameter information for indicating the priority of the respective characteristics of the protocols A, B, C,... and C, D, E,... usable by them, and at the time of the communication obtain the parameter information from the opposite device by the management protocol X of a high- order layer, compare it with the parameter information of the present device, automatically select the protocol matched with the protocol usable by the present device whose priority in the present device is higher and perform the communication.



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CLAIMS

[Claim(s)]
[Claim 1] In the network system of the multi-protocol environment which come [protocol / of a seed] to interconnect alternatively through a network in two or more usable equipments respectively said each equipment Each holds the parameter information which shows the priority of each property of an usable protocol. The network system characterized by communicating by acquiring said parameter information from partner equipment, and self-equipment making automatic selection of the higher protocol of the priority in self-equipment in accordance with an usable protocol as compared with said parameter information on self-equipment in the case of a communication link.
[Claim 2] The network system according to claim 1 characterized by enabling a package setup of the protocol used in said each equipment, and its priority through a network.
[Claim 3] Said each equipment is a network system according to claim 2 characterized by repealing the protocol which was not specified as a protocol to be used.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the network system of a multi-protocol environment.
[0002]
[Description of the Prior Art] Many of Local Area Networks (it is hereafter described as LAN.) which are carrying out current spread are used in many cases in the multi-protocol environment which communicates by using alternatively properly two or more sorts of protocols (TCP/IP, IPX/SPX, NetBEUI, Apple Talk, DLC, etc.) which the operation system (for example, Windows 95, WindowsNT, UNIX, etc.) of a client or a server is supporting. In a multi-protocol environment, since it is connectable by using a protocol properly according to a partner also to the partner from whom OS differs, the network system with which the equipment with which a manufacturer differs from a model is intermingled can be built.
[0003]
[Problem(s) to be Solved by the Invention] However, since the partner equipment which is going to communicate is not supporting all the same protocols as self-equipment, a user should just choose which protocol in the case of a communication link, or may waver in decision. For example, it sets to LAN of a multi-protocol environment which comes to connect two or more terminal units, such as a personal computer (for it to be hereafter described as PC.), and two or more peripheral devices, such as a printer. When it is going to transmit data to the peripheral device which has used a certain terminal unit, Although the user of the terminal unit has to determine with which protocol it communicates When the protocol of a phase hand's peripheral device is not known, it investigates using the function of another utility program of the terminal unit, or it actually cannot but go to the place of a phase hand's peripheral device, and cannot but confirm. Moreover, since there are a suitable thing and an unsuitable thing in a protocol by the network gestalt, the purpose of use, the employment Ruhr, etc. even if an usable protocol is known with a phase hand's peripheral device, a know how is needed for choosing a suitable protocol. Then, the technical problem which this invention tends to solve is to offer the network system of the multi-protocol environment which can communicate by choosing a suitable protocol automatically between the equipment connected through the network, without troubling a user for a protocol setup.
[0004]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, in invention according to claim 1 In the network system of the multi-protocol environment which come [protocol / of a seed] to interconnect alternatively through a network in two or more usable equipments respectively said each equipment Each holds the parameter information which shows the priority of each property of an usable protocol. It is characterized by communicating by acquiring said parameter information from partner equipment, and self-equipment making automatic selection of the higher protocol of the priority in self-equipment in accordance with an usable protocol as compared with said parameter information on self-equipment in the case of a communication link. Moreover, in invention according to claim 2, it is characterized by enabling a package setup of the protocol used in said each equipment, and its priority through a network in the network system according to claim 1. Moreover, in invention according to claim 3, said each equipment is characterized by repealing the protocol which was not specified as a protocol to be used in the network system according to claim 2.
[0005]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing. Drawing 1 shows an example of the gestalt of operation of this invention, and shows the example of a configuration of the network system which comes to connect mutually PC1 which is a terminal unit, and the printer 2 which is an example of the peripheral device possible [a communication link] through LAN100. In addition, although equipment is connected not only to PC1 or the printer 2 but to others at actual LAN3, in order to simplify explanation here, simplest example of a system configuration like illustration is explained. PC1 is supporting Protocols A, B, C, D, and E, and the printer 2 is supporting Protocols C, D, E, F, and G. That is, PC1 is equipment which can communicate by using it, choosing one of two or more protocols A, B, C, D, and E as arbitration, and a printer 2 is equipment which can communicate by using it, choosing one of two or more of the protocols C, D, E, F, and G as arbitration. PC1 and the printer 2 are respectively held in the memory which is not illustrated as a table as shows the parameter information which shows the priority of each property of the protocol which each is supporting to drawing 2 . In each parameter information, 1-5 of an item support one protocol, respectively, and the item of a protocol name, a function, the engine performance, and a priority value is established for every protocol so that it may illustrate. The notations (A, B, C, D, etc.) which show the protocol name which each equipment is supporting are written in the item of a protocol name. The characteristic value of each protocol when making these into a parameter is written down in the item of a function, the engine performance, and a priority value for the integers from one to ten. Here, it considers as that of the basis which is excellent in the property, so that a numeric value is large. Moreover, a priority value expresses the situation according to individual of each another equipment (PC1, printer 2) as the function of a protocol, and the engine performance numerically. Although existence of two or more protocols with the same value is allowed about the value of a function and the engine performance, it is a value which is altogether different for every protocol about a priority value.

[0006] The data hierarchy structure (layer structure) of the network system of the gestalt of this operation is shown in drawing 3 . Each equipments 1 and 2 have the higher-level protocol (henceforth management protocol) layer for referring to the parameter information (P) shown in drawing 2 between the various protocol layers containing various protocols (A, B, C, D, etc.), and the application layer in the top layer mutually between each equipment 1 and 2 so that it may illustrate. Management protocol X is a protocol for which is [no] equivalent to transport protocols and it depends on the protocol of the various above-mentioned protocol layers. That is, without depending for each equipments 1 and 2 on the protocol which a partner has by using the above-mentioned management protocol X, it communicates with the protocols (A, B, C, D, etc.) of arbitration which he has, and enables it to try acquisition of a partner's parameter information with the gestalt of this operation.

[0007] Next, actuation of the gestalt of this operation constituted as mentioned above is explained. Drawing 4 advances an acquisition demand of the parameter information P by Protocol A first to equipment 2, when the parameter information acquisition procedure between two equipments connected possible [a communication link] through the network tends to be illustrated, for example, equipment 1 tends to start a communication link to equipment 2. When there is no response, equipment 1 advances an acquisition demand of the parameter information P by this protocol A similarly with Protocol B next. By repeating this parameter information acquisition actuation, equipment 1 acquires the parameter information P from equipment 2. In the example of drawing 4 , when an acquisition demand of the parameter information P is advanced by Protocol C, there is a response from equipment 2, and the case where the parameter information P on equipment 2 is acquirable is shown. Even if it repeats the above-mentioned parameter information acquisition actuation, when a response is not obtained from equipment 2, it is judged that there is no protocol which can communicate between equipment 1 and equipment 2. If the parameter information P on equipment 2 is acquirable as mentioned above, equipment 1 selects the protocol with equipment 2 used in the case of a communication link by comparing the mutual parameter information P and extracting the largest thing of the characteristic value of the engine performance or a function out of a common protocol.

[0008] Drawing 5 illustrates the processing flow in the case of giving priority to the engine performance and selecting a protocol, and if the parameter information P on equipment 2 is acquirable, equipment 1 compares the mutual parameter information P, extracts the protocol (C, D, E in this case) which is common first (S1), and extracts a protocol (C, D in this case) with the largest values in performance from that inside further (S2). and -- the case where more than one exist although that protocol was determined as the protocol used when the

number of the protocols which fulfill conditions was one (it is No at S3) -- (-- S3 -- Yes) -- the largest protocol (D in this case) of a priority value is extracted more, and this is determined as the protocol used. Moreover, what is necessary is just to change the contents of processing in step S2 of the processing flow of drawing 5 so that a protocol with the largest functional value may be extracted when priority is given to a function and it selects a protocol.

[0009] Drawing 6 shows the command which the above-mentioned management protocol X gives to each equipment, and its specification (the contents of the command), and in the above-mentioned case, equipment 1 reads the contents of the parameter information P on equipment 2 according to the information acquisition command Get (p, n), performs extract processing of steps S1-S3, and selects the protocol used. The information on the selected protocol used is a management protocol. It is transmitted to equipment 2 as a setting command Set (p, n). The equipment 2 which received this setting command Set (p, n) rewrites the parameter information on own to the value specified by the setting command Set (p, n). (It corresponds to claim 1 above) Although it set above and the case of a protocol setup between two equipments 1 and 2 was explained As shown in drawing 7 , when much equipments 1, 2, and 3, ..., N are connected to LAN100, For example, the setting command Set (p, n) of the management protocol X is broadcast from a network administrator's equipment N to all the equipments 1, 2, and 3 on LAN100, and ... (multiple address transmission). All the equipments that received the setting command Set (p, n) rewrite each parameter information (a protocol and its priority) to the value specified by the setting command Set (p, n). Thereby, they are collectively set up by the protocol used in each equipments 1, 2, and 3, ..., N, and its priority through LAN100. A protocol with a large priority value is selected preferentially, and a communication link is performed using the optimal protocol as it selects Protocol G to top priority by the processing flow of drawing 5 when the priority value of 1 to 7 is assigned to G in order as a result of [the] A (for example, a protocol), and Protocol F is selected, when this cannot be used.

[0010] As mentioned above, a package setup of the parameter information (a protocol and its priority) is carried out at all the equipments 1, 2, and 3 on LAN100, and ... By communicating according to the Ruhr (network policy) about employment of a setting network etc. by carrying out priority use of the protocol with a large priority value systematically per network Since it can prevent beforehand that the protocol which is not adapted for the Ruhr is selected, the increment in the management cost for corresponding to an increment and it of communication failure can be suppressed. That is, although the increment in communication failure or management cost will be caused when the protocol used on a network by the Ruhr is restricted, and the protocol which breaks the Ruhr is used, such fault is canceled by using it with all the equipments on a network, unifying the protocol which suited the Ruhr. (It corresponds to claim 2 above) While reducing the waste and the unnecessary protocol processings of resources (memory resource etc.) in each equipment by giving the function which makes an invalid the protocol which was not specified again as a protocol used for each equipments 1, 2, and 3, ..., N (it is made to down), unnecessary packet sending out by the protocol which is not used can be prevented. While opening the resource of each equipment wide and mitigating a load by this, network traffic volume is decreased and increase of communication failure or management cost can be prevented. However, it is OSI as it is shown in drawing 8 in preparation for such a situation, since there is a possibility that a communication link may become completely impossible when it becomes impossible to communicate with a protocol present in use by a certain cause. Reference model 2-3 The protocol Z of layer level is defined and only the packet by this protocol Z is always changed into the waiting state waiting for receiving. Protocol Z is a simple protocol of a low and has the function to return effectively all the protocols of the equipment which received the invocation command. (It corresponds to claim 3 above)

[0011]

[Effect of the Invention] As explained above, according to this invention, the following outstanding effectiveness can be demonstrated. In invention according to claim 1, it sets to the network system of a multi-protocol environment. The parameter information each equipment connected to the network indicates the priority of each property of an usable protocol to be respectively is held. Since it was made to communicate by acquiring parameter information from partner equipment and self-equipment making automatic selection of the higher protocol of the priority in self-equipment in accordance with an usable protocol as compared with the parameter information on self-equipment in the case of a communication link It can communicate by choosing a suitable protocol automatically between the equipment connected through the network, without troubling a user for a protocol setup. Moreover, since a package setup of the protocol used in each equipment on the assumption

that a system configuration according to claim 1, and its priority was enabled through the network in invention according to claim 2 By communicating according to the Ruhr about employment of a setting network etc. by carrying out priority use of the high protocol of priority systematically per network It can prevent beforehand that the protocol which is not adapted for the Ruhr is selected, and the increment in the management cost for corresponding to an increment and it of communication failure can be suppressed. Moreover, in invention according to claim 3, since it constituted so that the protocol which was not specified as a protocol which uses said each equipment on the assumption that a system configuration according to claim 2 might be repealed, while opening the resource of each equipment wide and mitigating a load, network traffic volume can be decreased and increase of communication failure or management cost can be suppressed.

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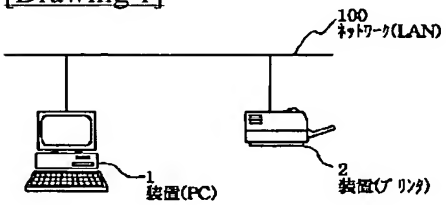
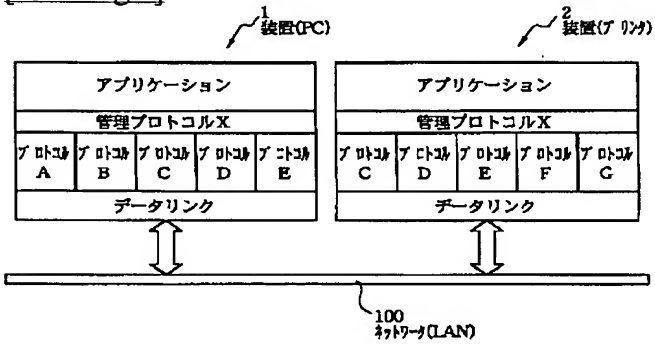
DRAWINGS

[Drawing 1]



[Drawing 3]



[Drawing 2]

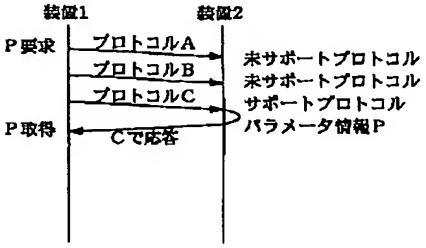
装置1

	パラメータ1	パラメータ2	パラメータ3	パラメータ4
項目	プロトコル名	機能	性能	優先値
1	A	6	5	4
2	B	7	6	8
3	C	8	8	6
4	D	9	6	7
5	E	8	5	5

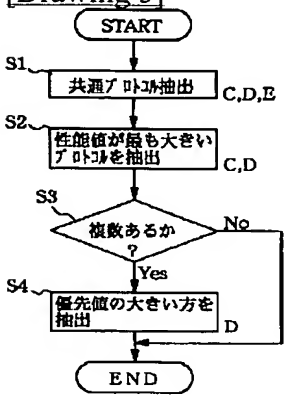
装置2

	パラメータ1	パラメータ2	パラメータ3	パラメータ4
項目	プロトコル名	機能	性能	優先値
1	C	8	6	6
2	D	9	6	7
3	E	8	4	5
4	F	9	8	8
5	G	7	5	4

[Drawing 4]



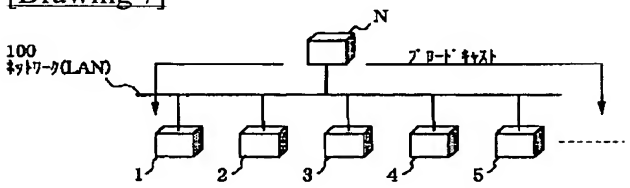
[Drawing 5]



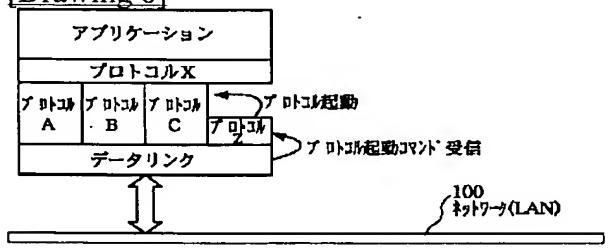
[Drawing 6]

コマンド	仕　様
Get(p,n)	パラメータ情報P(プロトコルp,パラメータn)の内容を読む
Set(p,n)	パラメータ情報Pを書き込む

[Drawing 7]



[Drawing 8]



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